Beer Vocabulary

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On the cover- illustration by the German Baroque painter Johan Georg Heinz (1630-1700). Beer appears in several of his paintings.

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Introduction

This publication serves as a complement to another titled Introduction to beer, The former is aimed at people who are relatively new to learning about beer. This one is aimed at those who want to delve deeper into the subject. The work can be used as a dictionary or it can be read from beginning to end as a regular book.

The 585 terms below were gathered from many sources about beer, including books, websites and videos. Five of the books are dictionaries: *Dictionary of Beer & Brewing* (Dan Rabin and Carl Forget, 1998); *The Oxford Companion to Beer* (Garrett Oliver, editor (2011); *An Illustrated Dictionary for Beer Lovers* (Mark Brewer, 2015); *The Craft Beer Dictionary, An A to Z of Craft Beer, from Hop to Glass* (Richard Croasdale, 2018); and *Beer Drinker's Dictionary* (Gregg and Lisa Smith, 2020).

A

ABBEY BEER- beer made by a non-trappist convent or by a secular brewery with or without a contract with a convent, generally similar to Trappist beer.

ACETALDEHYDE- C_2H_4O, intermediate compound in the production of alcohol, its aroma recalls green (unripe) apples, also intermediate in the metabolism of alcohol in our liver.

ACETIC ACID- CH_3COOH, compound responsible for the aroma of vinegar, produced by the bacterium *Acetobacter.*

ACETOBACTER- genus of bacteria that produce acetic acid, imparting a vinegary note.

ACID REST- pause during mashing when the temperature is held at about 95 ^oF (35 ^oF) to reduce the pH of the wort.

ACIDULATED MALT- malt with a low pH because lactic acid fermentation happens naturally during its production, used to reduce the pH of the wort, compare with biological acidification.

ACROSPIRE- stem that sprouts from the barley grain, its size indicates when germination should be stopped in order to proceed to the kilning phase of malt production.

ADDITIVE- compound or material added to beer in order to change one of its properties or to conserve its appearance, aroma and flavor (examples: clarifying agents, vegetable dyes, antioxidants).

ADJUNCT- secondary sugar source that the yeast ferments to produce alcohol (examples: rice, corn, sugar, honey).

AERATION- adding air to the wort so that the yeast can carry out more cellular respiration and reproduce faster, called oxygenation when pure oxygen is used.

AEROBIC- chemical process that occurs in the presence of oxygen, for example cellular respiration during the second phase of fermentation, see anaerobic.

AFTERTASTE- finish, sensation of flavor that remains in the mouth after swallowing the beer, varies from almost non-existent to strong and persistent, commonly described as dry, sweet, very sweet, bitter, sour, ephemeral or long-lasting.

AGING- *cellaring*, allowing certain beers to rest so that they acquire new and pleasant aromas and flavors.

AIRLOCK- fermentation lock, bubbler, device inserted into the stopper (bung) of the fermentation vessel (carboy) so that carbon dioxide escapes without air entering.

ALCOHOL- 1. compound with one or more hydroxyl groups (-OH) connected to a carbon atom, 2. used commonly as a synonym of ethyl alcohol (ethanol).

ALCOHOL BY VOLUME (ABV, alc/vol)- amount of alcohol divided by the amount of beer, included in most labels although not required.

ALCOHOL BY WEIGHT (ABW)- weight of the alcohol divided by the weight of the beer, since alcohol weighs less than water this value is lower than ABV (ABW x 1.25 = ABV).

ALCOHOLIC FERMENTATION- process used by yeast to produce energy in the absence of oxygen, converts one molecule of glucose into two of ethyl alcohol and two of carbon dioxide.

ALE- beer fermented by *Saccharomyces cerevisiae.*

ALEURONE- layer of cells that surrounds the starch deposit in barley grains, produces the enzymes that break down starch (amylases) and proteins (proteases).

ALL-EXTRACT BEER- beer made using malt extract as the only sugar source.

ALL-GRAIN BEER- beer made using cereal grains as the only sugar source.

ALL-MALT BEER- beer made using barley malt as the only sugar source.

ALPHA ACIDS- main acids present in hop resins, when boiled they turn into iso-alpha acids that contribute most of the bitterness in beer, the main ones are humulone and cohumulone.

ALPHA AMYLASE- malt enzyme that breaks starch into smaller chains of glucose molecules, see beta amylase.

ALPHA AMYLASE REST- saccharification rest, pause during mashing when the temperature is held close to 160 ºF (71 ºF) so that the enzyme alpha amylase functions optimally.

ALTBIER- beer native to Düsseldorf, Germany, copper-brown in color, fermented with ale yeast but matured at lager temperatures, alt means old in reference to the old way of fermenting (versus the new one used for lagers), alcohol content is around 4.8%.

ALTERNATING PROPRIETORSHIP- legal agreement between a brewer and another brewery to make beer there as if he owned the brewery, see contract brewing.

AMBER LAGER- general name for several lagers brewed with a portion of dark malt that produces an amber, sometimes reddish color, they're slightly sweet, with roasted malt notes and finish quite dry.

AMERICAN AMBER ALE- beer whose color derives from the use of caramel malt that imparts a sweet, somewhat toasty flavor with caramel notes, alcohol content varies from 5.0 to 6.0%.

AMERICAN AMBER LAGER- a product of the American craft beer movement, resembles Vienna Lager and Märzen but tends to be more intense and the hops stand out more.

AMERICAN BLONDE (GOLDEN) ALE- craft beer developed to attract drinkers of pale lagers and therefore resembles them, produces a thin layer of foam with a pleasant fruity aroma, alcohol content typically varies from 4.5 to 5.0%.

AMERICAN INDIA PALE ALE (IPA)- beer inspired on the English IPA, from which it is distinguished by the aroma and intensity of the American hops, very popular and there are many variants.

AMERICAN LAGER- American pale lager, American pilsner, American industrial lager, American adjunct lager, beer brewed in the United States since the late 19th century using corn or rice as adjuncts, low in aroma and flavor, ends dry (crisp).

AMERICAN LAMBIC- name used initially for beers brewed in the United States using spontaneous fermentation, abandoned in deference to Belgian lambics, see American Wild Ale.

AMERICAN LIGHT LAGER- 1. American lager lower in calories and alcohol than the regular version, 2. American lager light in color and body but not lower in calories and alcohol.

AMERICAN PALE ALE- pioneer beer of the craft movement, inspired by the English pale ale from which it differs by the intensity of the hops and their pine and citrus notes, alcohol content varies from 4.5 to 6.2%.

AMERICAN RED ALE- beer whose color derives from the use of caramel and specialized malts that impart a sweet, slightly roasted flavor with caramel notes, the red color is best seen against the light, alcohol content ranges from 5.0 to 6.0%; considerably hoppier versions are sometimes called Northwest Red Ale.

AMERICAN STRONG ALE- name used for American craft beers with more than 7% ABV that cannot be comfortably assigned to other styles; the group has no uniformity of color, aroma, or flavor but the sweetness of the malt and the bitterness of the hops are generally in balance.

AMERICAN WHEAT BEER- beer made with 30 to 50 percent wheat malt, has no clove aroma, alcohol content ranges from 4.0 to 5.5%, some breweries produce a considerably hoppier version called Northwest Wheat Ale.

AMERICAN WHITE OAK- *Quercus alba*, the wood from this tree is used to make bourbon barrels that are later used to age beer.

AMERICAN WILD ALE- sour beer fermented by yeasts and bacteria that may come from laboratory cultures or arrive from the environment, it often has the peculiar aroma of *Brettanomyces*, alcohol content varies from 5.0 to 10.0%.

AMINO ACID- $R\text{-}CH(NH_2)\text{-}COOH$, basic unit of proteins, R represents the chemical group that distinguishes one amino acid from another.

AMYLASES- malt enzymes that convert starch into sugars that the yeast is able to ferment, see alpha amylase and beta amylase.

AMYLOGLUCOSIDASE (AMG)- enzyme added to wort in order to convert residual (non fermentable) sugars into simple sugars that the yeast is able to ferment, used in the production of some light beers to reduce the amount of carbohydrates and therefore calories.

AMYLOPECTIN- starch composed of a linear chain of glucose molecules.

AMYLOSE- starch composed of a branched chain of glucose molecules.

ANAEROBIC- chemical process that occurs in the absence of oxygen, for example the production of ethyl alcohol and carbon dioxide during fermentation, see aerobic.

ANGEL’S SHARE- water and/or alcohol lost by evaporation while beer ages in wooden barrels.

ANTIOXIDANT- compound that protects beer from oxidation reactions that damage it, for example ascorbic acid and sulfites (commonly used in wine).

APPARENT ATTENUATION- estimate of the amount of sugar that the yeast converts into alcohol and carbon dioxide, the exact calculation is called real attenuation.

AROMA- the odor of beer, produced by the malts, hops and several compounds made by the yeast, changes when beer warms, ages or is exposed to light.

AROMA HOP- finishing hop, flavoring hop, hop that imparts mostly aroma, added late during boiling and sometimes after that step, see dry hopping.

ASCORBIC ACID- vitamin C, antioxidant sometimes added to stabilize the flavor of packaged beer.

ASTRINGENCY- strong sensation of bitterness and dryness, considered a fault in almost all beers, common in red wine.

ATTENUATION- conversion of sugar into alcohol and carbon dioxide during fermentation, yeasts with high attenuation ferment almost all the sugar and the beer ends dry (crisp), those with low attenuation leave more sugar and the beer is sweeter.

AUTOLYSIS- cell death caused by enzymes that digest organelles and large molecules, dead yeast can produce notes of meat or soy sauce.

B

BALANCE- relative contribution of the malts and the hops to beer flavor, a beer in which neither dominated is a balanced beer, see malt forward and hop forward.

BALANCED BEER- beer in which neither malts nor hops dominate, but are found in balance,

BALTIC PORTER- dark or black lager originating in the Baltic countries, brewed with dark malt, its sweet and toasty note is often accompanied by chocolate aroma, it also has notes of raisins or other dark fruits, alcohol content varies from 7.0 to 10.0%.

BANANA BEER- African beer made using banana juice as main sugar source.

BARLEY- *Hordeum vulgare,* grass native to Northeast Africa, the Middle East, and parts of Asia, its grains are the primary source of sugar for making beer, see two-row barley and six-row barley.

BARLEY WINE- English dark ale brewed with a lot of malt that produces complex flavors including caramel, molasses, nuts, and dark fruit, American versions are hoppier, alcohol content varies from 8.0 to 14.0%.

BARREL- 1. vessel made of wood or metal, used to store, ferment, mature or age beer, 2. unit of volume that in the United States equals 31 gallons (117 liters).

BARREL AGING- aging beer in wooden barrels (generally oak) usually used earlier to age liquor or wine, bourbon barrels are very popular in the United States.

BASE MALT- main malt used for making beer, contains fermentable sugar, typically pale, usually made form barley or wheat.

BATCH- amount of a beer produced at one time, varies greatly depending on the size of the brewery.

BATCH FERMENTATION- usual method of fermentation, where the process begins and ends, the equipment is cleaned and it starts again, each repetition produces a batch of beer, see continuous fermentation.

BEER- alcoholic beverage produced from water, malt, hops and yeast; however, there are those who use the term for similar drinks made without malt and/or hops (examples: chicha, banana beer, cassava beer, sake).

BEER-CLEAN GLASS- a perfectly clean beer glass, forms no bubbles on its inner surface.

BEER GARDEN- *biergarten*, traditionally an area with trees and benches where people gather to eat and drink beer, common in Germany and Austria, originated near hills where beer was cellared.

BEER ENGINE- manual pump used to dispense cask ale in British pubs.

BEER SKIMMER- beer comb, instrument similar to a tongue depressor, used to level the foam with the glass.

BEER STONE- beerstone, tough film of calcium oxalate that forms on the bottom of tanks and kegs, creates a substrate where microorganisms may grow.

BELGIAN ALES- these beers share characteristics such as the use of yeast that imparts fruity notes, the use of sugar to increase alcohol content, low hop aroma and bitterness, bottle conditioning, abundant effervescence, and a dry finish, alcohol content is typically high.

BELGIAN BLONDE ALE- clear, easy-drinking, light-bodied, slightly sweet beer with little hop influence and a fruity or spicy note from the yeast, alcohol content ranges from 6.3 to 7.9%.

BELGIAN DARK STRONG ALE- strong, dark beer with a sweet and complex flavor, alcohol content ranges from 7.0 to 11.0%.

BELGIAN GOLDEN (BLONDE) STRONG ALE- strong, golden ale with hints of fruit and spices, alcohol content ranges from 7.0 to 11.0%.

BELGIAN IPA- name used for American IPAs fermented with Belgian yeast or Belgian ales made with one or more American hops.

BELGIAN PALE (AMBER) ALE- beer developed early in the 20th century to compete with English ales and pilsners, sweetish and amber in color like an English pale ale but light-bodied like a pilsner, alcohol content is around 5.0%.

BELGIAN WHEAT BEER- Belgian white beer, witbier, bière blanche, ale native to Flanders made with 30 to 40 percent unmalted wheat, coriander seeds and dried orange peel, alcohol content varies from 4.5 to 5.0%.

BERLINER WEISSE- Berlin wheat beer, Berlin white beer, sour beer made with one-third to one-half wheat malt, in Berlin it’s often served with sweet syrup to partially neutralize the acidity, the alcohol content there can be as low as 2.5%.

BEST-AFTER DATE- date used occasionally to identify a beer that should be aged to achieve its optimum flavor.

BEST-BEFORE DATE- best by date, freshness date, date before which it is recommended to consume the beer so that it has the aroma and flavor intended by the brewer.

BETA ACIDS- secondary group of acids present in hop resins, the main one is called lupulone.

BETA AMYLASE- malt enzyme that breaks down the glucose chains produced by alpha amylase into sugars that yeast can metabolize, maltose being the most common.

BETA AMYLASE REST- maltose rest, pause during mashing when the temperature is held close to 145 °F (63 °F) so that the enzyme beta amylase can function optimally.

BIG BEER- beer typically with more than 8% ABV, in temperate countries it is consumed mostly during the winter, see winter beer.

BIÈRE DE GARDE- literally beer for keeping, ale traditionally brewed in farms of northern France in early spring for consumption during the summer, alcohol content ranges from 6.0 to 8.5%.

BIERGARTEN- beer garden, in Germany an open-air place with trees where beer is sold, originally located near caves and cellars where beer aged.

BIOLOGICAL ACIDIFICATION- reduction of wort pH by the addition of *Lactobacillus*, compare with acidulated malt.

BIOTRANSFORMATION- transformation by yeast of certain hop compounds hops into similar compounds with a different aroma.

BITTER WORT- wort after the hops are added.

BITTERING HOP- boiling hop, hop that imparts mostly bitterness, added early during boiling.

BLACK AND TAN- English drink where the bottom half of the glass is filled with pale ale and the top half with stout.

BLACK IPA- Cascadian Dark Ale, very dark or black India Pale Ale brewed with an amount of chocolate malt.

BLACK MALT- patent malt, specialty malt roasted to the point of turning black, used in small amounts to make dark or black beers, imparts strong roasted notes.

BLACK VELVET- English drink where the bottom half of the glass is filled with champagne and the top half with stout, called Bismarck in Germany.

BLENDING- mixing two or more beers to obtain a final flavor, common in the production of barrel-aged beers and sour beers, specialists and companies dedicated to this task are known as blenders and blenderies.

BOCK- golden to brown German lager, brewed with more malt and therefore higher in alcohol (usually 6.0 to 8.0%), the label often has a male goat, consumed in Germany mostly in spring.

BODY- impression of beer density, beers with little body feel watery, those with a lot of body feel dense.

BOIL- boiling, process of boiling the wort typically for 60 to 90 minutes, bittering hops are added at the start and aroma hops near the end.

BOTTLE BOMB- beer bottle that explodes due to excessive carbonation.

BOTTLE CONDITIONING- refermentation, carbonation method that consists of adding sugar and yeast, the beer is bottled and a new fermentation produces the gas, it can also happen in cans and barrels.

BOTTOM FERMENTATION- fermentation with lager ale, thus called because towards the end of the process the yeast flocculates mostly at the bottom of the liquid.

BOUQUET- 1. general aroma of a beer, 2. aroma of the hops used to make a beer.

BRANDING- creation of an image and identity for a beer, so that the public decides to buy it, includes among other factors the design of the label, repeating the process with the same beer is called rebranding.

BRAUORDNUNG- decree issued in 1553 by the Duke of Bavaria limiting the making of beer to the period between September 29 and April 23, favoring inadvertently the brewing of lagers.

BREAK- precipitation of proteins associated with polyphenols and carbohydrates, see cold break and hot break.

BRETT BEER- beer brewed with the participation of *Brettanomyces* yeast.

BRETTANOMYCES- *brett*, yeast used in the fermentation of some beers, frequently imparts aromas that recall leather, stables and horse blankets, as an invader it can ruin beer.

BREW HOUSE- beer house, part of the brewery where the bitter wort is made.

BREW KETTLE- boiling kettle, copper, round tank where the wort and hops are boiled, formerly made of copper and with its long chimney was the most attractive element of the brewery.

BREWERIANA- activity of collecting all types of beer-related artifacts, including bottles, cans and glasses.

BREWER’S YEAST- strains of *Saccharomyces cerevisiae* used to make beer, other strains are used for making bread and wine.

BREWMASTER- the brewery’s main brewer, prepares recipes for new beers, supervises brewing, responsible for the quality and consistency of the product.

BREWPUB- small brewery that sells directly to the public and often also serves food.

BREWSTER- alewife, woman who makes beer, until the industrial revolution beer was made mostly by women, all wives were expected to have this skill.

BRIGHT BEER- beer ready for packaging (whether it is clear or opaque).

BRIGHT TANK- tank that contains beer ready for packing, can be used to carbonate the beer, add colorants and preservatives, blend different batches, and make other adjustments.

BROWN ALE- English beer made with a larger portion of dark malt, it is sweet, with notes of caramel and sometimes also of nuts or chocolate, American variants frequently have more alcohol and hops, alcohol content ranges from 5% to very high in imperial versions.

BRUT IPA- India Pale Ale made with very little residual sugar, has a dry finish reminiscent of brut champagne.

BURTON SALTS- blend of calcium sulfate, magnesium sulfate, and potassium chloride used to impart pale ales with the character of the versions made with the water of Burton-on-Trent, England.

BUTYRIC ACID- butanoic acid, C_3H_7COOH, compound produced by bacteria whose odor recalls among others baby vomit, rancid butter, stinky cheese and spoiled milk.

C

CALIFORNIA COMMON- steam beer, amber-reddish lager native to San Francisco, sweetish, with fruity notes provided by the yeast, made with lager yeast at ale temperature, alcohol content varies from 4.6 to 5.7%.

CALORIE- measure of the energy present in a substance or food, approximately one-third of the calories in beer come from residual sugars and two-thirds come from alcohol.

CAMRA- Campaign for Real Ale, organization founded in 1971 to combat the disappearance of cask ale (real ale) in British pubs.

CANDI SUGAR- product prepared from beet sugar, used traditionally to increase the alcohol content of Belgian ales, sometimes also to darken the beer, available liquid or as large crystals (rocks).

CARAMEL- sugar heated to the point of melting and turning dark, used to modify the color and flavor of some beers.

CARAMEL MALT- crystal malt, brownish specialty malt, made so that the sugar crystallizes in the grain, adds color and caramel flavor with hints of peanuts and other nuts.

CARBOHYDRATE- compound made of carbon, hydrogen and oxygen, sugars are carbohydrates and starch is a long chain of sugars.

CARBONATION- amount of carbon dioxide dissolved in beer, 25 ounces (739 ml) of the gas dissolved in 10 ounces (296 ml) of beer is equivalent to 2.5 volumes of carbonation.

CARBON DIOXIDE- CO_2, gas produced by yeast during cellular respiration and alcoholic fermentation.

CARBOY- narrow-mouthed container used by homebrewers to ferment beer, the most common holds 5 gallons (19 liters).

CASCADE- American hop used in early craft beers, especially American pale ales, it has been called the hop that made hops famous.

CASE- commercial unit consisting of 24 bottles or cans.

CASK ALE- beer matured, carbonated and served directly from a small barrel (cask), it is the traditional beer served in British pubs, see CAMRA.

CASSAVA BEER- manioc beer, beer brewed by the Taino Indians using the juice of the cassava root as a source of sugar, sweet and bitter varieties were made.

CELIAC DISEASE- chronic digestive disorder caused by the inability to digest proteins present in barley, wheat and other grains.

CELLAR- formerly an underground space used for aging and storing beer, its ideal temperature is 55 ^{o}F (13 ^{o}C).

CELLULAR RESPIRATION- metabolic process used by the yeast to produce energy in the presence of oxygen, one molecule of glucose is converted into six molecules of water and six of carbon dioxide.

CENTRIFUGATION- process of spinning beer in a centrifuge to concentrate and remove suspended particles, thus clarifying the beer.

CEREAL- grass cultivated for its seeds, the main ones for making beer are barley and wheat.

CHAMPAGNE YEAST- strains of *Saccharomyces cerevisiae* capable of producing alcohol when brewing strains no longer tolerate it, used to make some high-alcohol beers.

CHARACTER- appreciation of the complexity of beer, one with little character has little aroma and flavor, and feels watery, one with a lot of character has a strong aroma, a complex and intense flavor, and feels dense.

CHICHA- old Central and South American beer, the women of the village chewed corn to convert the starch into sugar, today made with corn malt.

CHILL HAZE- haziness caused by some proteins when the beer gets very cold, disappears when the temperature increases and does not affect aroma or flavor.

CHILLER- heat exchanger, equipment used to rapidly cool the wort to fermentation temperature.

CHIT MALT- malt made from recently germinated barley, used to increase body and stability of the foam layer.

CHITTING- start of the germination process, the seed coat splits and the embryo starts growing.

CHOCOLATE MALT- dark brown specialty malt, used for making dark beers, contributes aromas and flavors of roasted malt, nuts, coffee and chocolate.

CHOCOLATE STOUT- stout brewed with the addition of chocolate.

C-HOPS- group of American hops whose names begin with the letter C, very popular in craft beers (examples: Cascade, Centennial, Chinook, Citra, Columbus).

CICERONE- beer specialist certified by the Cicerone Certification Program, there are four levels: Certified Beer Server, Certified Cicerone, Advanced Cicerone, and Master Cicerone.

Kennedy, Justin. The Scratch & Sniff Guide to Beer: A Beer Lover's Companion (p. 146). Harper. Kindle Edition.

CLARIFICATION- process of reducing the opacity or turbidity of beer, either by allowing it to rest, adding clarifying agents, centrifuging, and/or filtering.

CLARIFYING AGENT- fining agent, finings, compound or material added to beer in order to coagulate and precipitate proteins, yeast cells and other very small particles that cause turbidity.

CLARITY- appearance of beer according to the amount of light it lets through, from crystal clear to very cloudy, depends on the amount of protein and particles in suspension.

CLOSED FERMENTATION- fermentation carried out in sealed tanks, carbon dioxide escapes to the outside through a valve, so that the internal and the external pressure are equal, see closed fermentation.

COFFEE STOUT- stout brewed with the addition of coffee.

COLD BREAK- precipitation of proteins and polyphenols when the bitter wort is cooled rapidly, improves beer clarity and stability.

COLD FILTRATION- technique for filtering the beer almost frozen so that proteins that can cause cloudiness are precipitated and removed, since the filters are extremely fine some breweries use this process instead of pasteurization.

COLD IPA- India Pale Ale brewed with ale yeast at low temperature or lager yeast at higher than usual temperatures.

COLD SIDE- brewing steps from cooling the bitter wort to finished beer.

COLLABORATION- collab, beer brewed in cooperation with another brewery, a person or a business.

COLOR- beer is straw colored, yellow, golden, amber, coppery, reddish, brown or black, depending mostly on the colors of the malts.

COLORANT- additive used to emphasize a tone or to change the color of a beer, the most common are caramel and vegetable dyes.

COMMON POUR- classic pour, the beer glass is tilted 45 degrees and approximately two-thirds of the liquid is poured along the wall, the glass is then raised gradually and the remaining beer is poured on the center of the foam layer, see hard pour and slow pour.

CONDENSATION- formation of minute water droplets on the surface of the glass when cold beer is poured, should not be confused with opacity when evaluating beer.

CONTINUOUS FERMENTATION- industrial method where wort continually enters the fermentation tank and young beer is continually removed, the yeast remains anchored in a porous medium, see batch fermentation.

CONTRACT BREWING- practice of contracting another brewery to make one or more beers.

COOLSHIP- cooling tun, rectangular, shallow open vessel where the wort was cooled, used today to inoculate lambics and American wild ales with wild microorganisms.

CORIANDER- *Coriandrum sativum*, the seeds of this plant have been used for centuries to make beer, required ingredient in Belgian wheat beer and Gose.

CORN- 1. *Zea mays, maize*, grass native to the New World, extensively cultivated, used as adjunct in many pale lagers, 2. In Britain, a generic name for grains of various cereals (examples: barley corn, wheat corn).

CRAFT BREWERY- generally a small or medium-sized brewery, with little or no automation, produces beer of various styles, usually unpasteurized.

CRAFT MALT- malt produced in small quantities for craft brewers, usually from uncommon varieties of barley.

CREAM ALE- beer similar to kölsch (ale yeast, matured at lower temperature) but made with corn as an adjunct, born during the mid-19th century in the United States, gained popularity after Prohibition but is uncommon today.

CRISP- dry, beer with little residual sugar that ends quickly and leaves little aftertaste.

CROWN CAP- common alternative for sealing glass bottles, some oxygen enters the bottle through its plastic seal.

CZECH DARK LAGER- ancient beer native to the Czech Republic, it is dark brown to almost black and is brewed using traditional Czech hops, roasted malt stands out well balanced by the bitterness of the hops, alcohol content is around 5.0% ABV.

CZECH PILSNER- Bohemian Pilsner, pale lager brewed with very low mineral water and traditionally using decoction, golden in color, less bitter and dry than German pilsner.

D

DANK- 1. very intense aroma produced by some hops, 2. hop aroma that recalls marihuana smoke.

DDH- double dry hopping, see dry hopping.

DECANTING- carefully pouring a bottle with yeast on the bottom so that it stays in the container and does not affect the beer’s color and flavor.

DECELERATION PHASE- period during fermentation when food begins to become scarce, waste accumulates and yeast population growth slows down.

DECOCTION- mashing technique that consists of removing part of the wort, boiling it and returning it to the original container, can be done one to three times (single, double or triple decoction).

DEMINERALIZATION- chemical removal of minerals to make beers that require soft water.

DEXTRIN MALT- specialty malt rich in dextrins, developed to increase body in pale beers without adding color or flavor, commonly known as Carapils®.

DEXTRINS- non-fermentable starch fragments composed generally of 4 to 25 glucose units, they are not sweet but contribute body.

DEXTROSE- corn sugar, glucose obtained commonly from corn starch.

DIACETYL- compound produced by the yeast during fermentation and eliminated by the yeast itself during maturation, in excess it imparts a butter or butterscotch flavor.

DIACETYL REST- period at the end of lager fermentation when the temperature is increased so that the yeast can eliminate diacetyl more efficiently.

DIASTASES- malt enzymes that convert starch into dextrins and fermentable sugars.

DIASTATIC POWER- enzymatic potential of a malt to convert its starch into sugar, a malt with high diastatic power produces more sugar than one with low diastatic power.

DIMETHYL SULFIDE- DMS, $(CH_3)_2S$, compound derived from the malts, in high concentration it recalls boiled corn or cabbage.

DINKEL BEER- beer made with a portion of spelta grains, *Tritium spelta*, a relative of wheat.

DIP HOPPING- method of adding hops that consists of transferring part of the wort to the fermentation tank, adding the hops, adding the rest of the wort when boiling is done, and proceeding with fermentation.

DISACCHARIDE- sugar made of two monosaccharides, the most common in brewing are maltose (two glucoses) and sucrose (one glucose and one fructose).

DISTILLER'S BEER- unhopped beer made by whiskey producers with the intention of distilling it and concentrating the alcohol.

DOPPEL- double in German, identifies a beer that is stronger than regular beer without meaning that it contains twice as much malt or alcohol.

DOPPELBOCK- lager native to Munich, made initially by monks to sustain them during fastings, rich in malt, reddish-brown, alcohol content ranges from 6.5 to 12.0%, their names end in -ator.

DORADA PAMPEANA- Pampas Golden Ale, beer born in Argentina when craft brewers tried to brew a golden ale with the ingredients they had on hand: pilsner malt, Argentine Cascade hops, and ale yeast, very similar to American Golden Ale.

DORTMUNDER EXPORT- Dortmunder, Dort, German Helles Exportbier, pale lager native to the city of Dortmund, whose mineral-rich water imparted its own character, for some aficionados the current versions are intermediate between German pilsner and Helles.

DOUBLE IPA- India Pale Ale brewed with more malt and hops, alcohol content typically varies from 7.0 to 10.0%.

DRAFT BEER- draught beer, keg beer, beer served from a tap connected by lines to a refrigerated keg, many craft beers are only available this way.

DRINKABILITY- impression of how easily a beer can be consumed, very drinkable beers are low in character and have less than 5 % ABV.

DRY BEER- extra dry beer, beer containing very little or no sugar, this is achieved by adding enzymes that break all the residual sugar and the yeast converts it into alcohol.

DRY FOAM- foam formed by packaged beer and regular taps, usually has a number of large bubbles and tends to be short-lived, see wet foam.

DRY HOPPING- addition of aroma hops after boiling to increase aroma and flavor without increasing bitterness, may be done once, twice (double dry-hopping) or three times (triple dry-hopping).

DUAL PURPOSE HOP- hop that imparts bitterness and aroma.

DUBBEL- dark Trappist beer typically with 6.0 to 7.5% ABV.

DUNKEL- Munich Dunkel, Dark Lager, everyday lager in Bavaria until it was displaced by Märzen during the second half of the 19th century, coppery red to brown due to the use of Munich malt, sweetish, with moderate bitterness and less than 5.5% ABV.

DUNKELWEIZEN- literally dark and wheat, German wheat beer dark in color due to the use of Munich malt that also provides a toasty or nutty note.

E

EAST COAST IPA- New England IPA (NEIPA), hazy IPA, juicy IPA, opaque and sweet India Pale Ale with an intense fruity aroma provided by the hops.

EBC- method used by the European Brewery Convention to specify the color of beer, its value is 1.97 times higher than that of the SRM system used in the New World, see SRM.

EBU- European Bitterness Units, system established by the European Brewery Convention to measure and compare the bitterness of beer, the values are equivalent to those of the IBU, see IBU.

EFFERVESCENCE- fizz, presence of gas in a beverage, almost always carbon dioxide, sometimes also nitrogen, see carbonation and nitrogenation.

EISBOCK- lager native to Franconia, Germany, whose high alcohol content is obtained by freeze distillation (see that entry), other beers produced by this method are known as ice beers, *eis* means ice in German.

ENDOSPERM- seed tissue that contains the food used by the embryo to germinate, main source of sugar and protein for making beer.

ENGLISH INDIA PALE ALE- hoppier version of the English Pale Ale, made this way to protect it during the long sea voyage from England to India, alcohol content ranges from 5.0 to 7.0%.

ENGLISH PALE ALE- beer made in the 18th century with malts that produced a light amber color, alcohol content ranges from 4.5 to 5.5%.

ENKEL- *patersbier*, Trappist beer with typically 4.8 to 6.0% ABV, brewed for the monks and their guests, sold occasionally to the public.

ENZYME- protein that facilitates chemical reactions, the main ones involved in brewing are amylases and proteases present in barley grains.

ESSENTIAL OILS- hop oils that impart aroma to beer (examples: caryophyllene, farnesene, geraniol, humulene, linalool, myrcene, nonanal).

ESTATE ALE- beer made with ingredients obtained in a single farm or property.

ESTERS- volatile compounds produced by the yeast that impart fruity notes.

ETHYL ACETATE- $C_4H_8O_2$, most common ester in beer and wine, its aroma recalls grapes, cherries and other fruits, in excess it recalls several solvents.

ETHYL ALCOHOL- ethanol, C_2H_5OH, main alcohol in beer.

ETHYL HEXANOATE- $C_8H_{16}O_2$, ester that imparts an aroma of apple, aniseed or licorice.

EXPERIMENTAL HOP- hop whose commercial potential is being evaluated.

EXPIRATION DATE- shelf life, date after which consuming a product may be harmful to health, does not exist for beer and should not be confused with the best-before date (see that entry).

EXPORT BEER- 1. beer adapted to the tastes of a foreign market, 2. stronger or higher quality beer made for exportation, this distinction was made during the Middle Ages.

EXTRA SPECIAL BITTER (ESB)- most intense version of Bitter (draft ale served in British pubs), coppery amber, with aroma of roasted malt and notable but not excessive bitterness, alcohol content is around 6.0%.

EXTRACT- all the materials dissolved in the bitter wort, including sugars, amino acids, proteins, minerals, vitamins, acids, aromatic oils and tannins.

F

FARMHOUSE ALES- beers brewed in old Belgian and French estates during the cold months for summer consumption (examples: Bière de Garde, Saison), variants made with more hops and more intense fruit notes have been called Farmhouse IPA.

FARO- lambic variant sweetened with sugar, molasses or caramel.

FATTY ACIDS- $CH_3(CH_2)nCOOH$, lipids necessary for yeast metabolism, some may damage beer by imparting aromas of soap and wet cardboard.

FERMENTABLE SUGAR- sugar that yeast can ferment, composed of one, two or three molecules (mono-, di- or trisaccharides), the main ones in brewing are glucose, fructose, maltose, sucrose and maltotriose.

FERMENTATION- metabolic process used by some cells to produce energy in the absence of oxygen, see alcoholic fermentation and lactic acid fermentation.

FESTBIER- in Germany, beer made for a celebration or festival (for example, Oktoberfestbier), usually a pale lager or märzen.

FILTRATION- process of passing beer through membranes or paper plates to remove suspended particles and render it transparent.

FINAL GRAVITY (FG)- specific gravity of the wort after fermentation divided by the density of water (1.0), it is expressed to four decimal points (for example, 1.010).

FIRST RUNNING- wort that exits the mashing process by gravity (before sparging), contains much sugar and can be used to make high-alcohol beers, see second running.

FLANDERS OAK AGED ALE- sour beer native to Flanders, fermentation is mixed and it matures for up to two years in oak vats where resident microorganisms provide complex notes, alcohol content varies from 4.0 to 6.0%.

FLANDERS OLD BROWN- Oud Bruin, style of Flanders Oak Aged Ale native to East Flanders, sweeter (less acidic) and very dark brown, many makers of this beer have substituted the oak vats for metal tanks.

FLANDERS RED ALE- style of Flanders Oak Aged Ale native to West Flanders, reddish and has a vinegary note produced by *Acetobacter*, one of the beers that most closely resemble wine.

FLAT BEER- still beer, beer with very little or no carbonation.

FLAVOR- combination of the sweet, salty, bitter, and sour (acidic, tart) substances detected by the tongue with the aromas that reach the nasal cavity from the throat.

FLAVOR WHEEL- circular diagram used to classify the aromas and flavors detected in beer.

FLIGHT- sampler, samples of beers made by a brewery, served in small glasses.

FLOATIES- dark-colored, irregularly shaped particles suspended in old beer, made of proteins that come out of solution and form clumps.

FLOCCULATION- natural grouping of yeast cells that occurs towards the end of fermentation.

FLORAL- adjective commonly used to describe the delicate aromas of noble hops.

FOEDER- large vat used in England during the 18th and 19th centuries to mature porter, used today in Belgium to mature Flanders Aged Ale and elsewhere for some craft beers.

4-ETHYL PHENOL- phenol that imparts an aroma of stables, produced by the yeast *Brettanomyces.*

4-VINYL GUAIACOL- phenol that imparts clove aroma, required in German wheat beer, present in some Belgian beers.

FORCED CARBONATION- process of carbonating beer by injecting it with carbon dioxide in a sealed container.

FORMAZIN TURBIDITY UNITS (FTU)- system used to measure the turbidity of beer and other a liquids.

FREEZE DISTILLATION- process of partially freezing a beer and removing a portion of the ice in order to increase the alcohol content of the remaining liquid.

FRESH HOPS- hops recently harvested and rapidly dried to preserve their properties and quality.

FRUCTOSE- $C_6H_{12}O_6$, one of two monosaccharides metabolized by yeast to produce energy, carbon dioxide, and alcohol, see glucose.

FRUIT BEER- berry beer, beer with fruit or juice added before or after fermentation.

FRUITED SOUR- Fruited Kettle Sour. American sour beer brewed with fruit, the wort is inoculated with *Lactobacillus* and when it reaches the desired pH it's boiled to kill the bacteria and fermentation proceeds, alcohol content typically varies from 4.0 to 5.5%.

FULL BODY- 1. beer with a lot of body, feels dense in the mouth, 2. regular version of a beer when compared with the light version (even though both are almost equally dense).

G

GASTROPUB- a pub that serves high quality food.

GATEWAY BEER- ale that resembles pale lagers, serves as an introduction or transition to stronger ales (examples: kölsch, American golden ale, some American wheat ales).

GELATIN- product made from collagen, used to clarify beer.

GERMAN PILSNER (PILS)- pilsner made with mineral-rich water, yellow in color, more bitter and drier than Czech pilsner.

GERMAN WHEAT BEER- Bavarian beer made with 50 to 70 percent wheat malt, turbid, with an aroma of cloves and sometimes banana, has a thick, creamy, long-lasting head.

GERMINATION- beginning of the development of a seed to give rise to a plant, second stage in the production of malt (the others are steeping and kilning).

GERMINATIVE CAPACITY- germination rate of barley grains during the initial stage of malting, a minimum of 98% germination is expected.

GEUZE- gueuze, blend of one, two and three-year old lambics, the unsweetened version is called oude geuze (old geuze).

GEUZERIE- business dedicated to producing geuze purchased from different breweries.

GLUCOSE- $C_6H_{12}O_6$, main monosaccharide metabolized by the yeast to produce energy, carbon dioxide and alcohol, see cellular respiration, alcoholic fermentation and lactic acid fermentation.

GLUTEN- glycoproteins present in the grains (seeds) of many cereals, including barley and wheat, see celiac disease.

GLUTEN-FREE BEER- beer free of gluten (proteins present in barley, wheat and other cereals), made for those who suffer from celiac disease or gluten intolerance.

GLYCOPROTEINS- proteins associated with sugars, present in barley and other cereals, contribute to the formation and retention of the foam layer.

GOSE- German sour beer brewed with 50 to 60 percent wheat malt, coriander seeds and salt, it is pale, cloudy, and effervescent, alcohol content generally varies from 4.0 to 5.0%.

GRAIN- dry fruit of a grass, inside is the seed with the embryo and its food reserve, frequently used as a synonym of seed.

GRAIN BILL- malt bill, mash bill, list of malts and adjunct grains used to make a beer.

GRAINY- beer aroma that recalls cereals.

GREEN BEER- young beer, freshly fermented beer, without conditioning or maturation.

GRISETTE- beer similar to saison but with less body and alcohol, consumed by miners instead of farm workers, according to some sources the name derives from the color of the extracted ore, according to others it refers to the color of the uniform used by women who served the beer.

GRIST- mix of milled malts and adjunct grains, ready to start making beer.

GRITS- milled grains used as adjuncts, usually corn or rice.

GROANING BEER- strong beer brewed centuries ago in Europe to coincide with childbirth, it was consumed by the expectant mother to relieve pain and also by those assisting in the process.

GROWLER- reusable container used to carry draft beer home, the most popular hold 32 (946 ml) or 64 (2.9 L) ounces.

GRUIT- mixture of herbs used to flavor and conserve beer before hops gained popularity.

GRUIT BEER- gruit ale, beer made with gruit instead of hops.

GRUITRECHT- *grutrecht*, payment made during the Middle Ages for the gruit needed to make beer, one of the first taxes on beer.

GUSHING- fobbing, sudden gush of foam and beer when a container is opened, it is due to several factors including contaminated malt, excessive carbonation or having shaken the container.

H

HALF AND HALF- drink made with equal parts of two different beers.

HARD POUR- the beer is poured aggressively on the glass from start to finish even if some of the foam spills, the goal is to produce a thick head, see classic pour and slow pour.

HARVEST ALE- historically a beer made to celebrate the harvest of a crop, today a beer brewed during the hop harvest and therefore made with fresh hops.

HEAD- foam layer, collar, layer of bubbles that forms on the surface of the liquid, beer is the only alcoholic drink that develops a persistent foam layer, see the next two entries.

HEAD GRAINS- protein-rich grains that promote the formation and retention of the foam layer, the main ones are wheat, oats and rye.

HEAD RETENTION- duration of the foam layer, in some beers the foam dissipates in a matter of seconds, in others it may last a while.

HEADSPACE- ullage, space between the beer and the top of the sealed container, cushions pressure changes.

HEAT EXCHANGER- equipment inside which cold water flows in opposite direction to hot wort, quickly reducing its temperature to the optimum for fermentation.

HEFEWEIZEN- literally yeast and wheat, see German wheat beer.

HELLES- Munich Helles, literally pale, clear, bright, pale lager native to Munich, born in 1894 as an alternative to the Czech pilsner, it is paler, with more emphasis on the malt and less on the hops.

HELLES DOPPELBOCK- golden variety of doppelbock, made with pale malts.

HIGH-ALPHA HOP- hop variety with an unusually high amount of alpha acids, varieties with even higher amounts have been called super-alpha hops.

HIGH-GRAVITY BREWING- heavy brewing, production of a high-alcohol beer to dilute it and produce beers with less alcohol.

HIGHER ALCOHOLS- fusel alcohols, alcohols with three or more carbon atoms (ethanol has two), they contribute to beer’s aroma and flavor but in excess recall lacquer and solvents (examples: propanol, butanol, isobutanol).

HIGHLY-MODIFIED MALT- malt rich in amino acids and soluble starch ready to be converted into sugar, produced by allowing germination to proceed longer before drying the barley grains, the opposite is called under-modified or poorly-modified malt.

HOP (pl. hops)- hop cone, mature sterile female inflorescence of *Humulus lupulus*, a climbing plant native to Europe and North America, resembles a small pine cone, hops are not flowers and do not contain flowers.

HOP BURN- hop bite, feeling of burning and/or strong astringency perceived when drinking heavily hopped hazy IPAs.

HOP CREEP- increase in the amount of diacetyl, alcohol and carbon dioxide in some intensely dry-hopped unfiltered

IPAs, caused by hop diastases, detected by the buttery odor of the diacetyl.

HOP EXTRACT- thick lupulin concentrate, popular due to its stability in storage and the absence of plant material that reduces beer yield, some do not react with light and avoid skunking (see tetra).

HOP FORWARD- beer in which the hops dominate over the malts.

HOP PELLETS- dry hops ground and made into pellets that resemble rabbit feed.

HOP *TERROIR*- aroma and flavor imparted to hops by the characteristics of a site, including topography, soil, water, and climate.

HOPBACK- hop percolator, vessel containing hops through which the wort flows for dry-hopping, a version developed by Sierra Nevada Brewing Co. is known as hop torpedo.

HOPHAZE- commercial product derived from hops and used to give beer a stable haze, added typically after filtration.

HOPPY BLONDE- American blonde ale made with more hops, reminiscent of a session IPA.

HOPPY KÖLSCH- kölsch variant made with more intense American hops.

HOPPY PILSNER- pilsner made with more hops than usual, thus hop aroma and flavor dominate over the malt.

HORIZONTAL TASTING- evaluation of the same beer style produced by different breweries.

HOT BREAK- precipitation of proteins and polyphenols while boiling the wort, improves beer clarity and stability.

HOT SIDE- brewing steps from mashing until the end of boiling.

HUMULONE- main alpha acid present in hops, see isohumolune.

HUSK- protective cover of the barley grain, helps clarify beer after mashing, mishandled it can contribute cloudiness and astringency.

HYBRID BEER- ale matured at lager temperature or lager matured at ale temperature (examples: altbier, kölsch, California Common).

HYDROGEN SULFIDE- H_2S, compound with the odor of rotten eggs, may be present in low concentration in some lagers.

HYDROMETER- densimeter, slender floating apparatus used to measure gravity and calculate alcohol content.

I

IBU (International Bitterness Units)- system used by the American Society of Brewing Chemists to measure the bitterness of beer, usually goes from 10 (slightly bitter) to 80 (very bitter), corresponds to isohumulone concentration in parts per million (1 IBU = 1 mg isohumulone in 1 L of beer).

IMPERIAL- adjective used for high-alcohol beers of different styles, see next entry; other examples are imperial IPA, imperial pilsner and imperial porter.

IMPERIAL STOUT- stout particularly high in alcohol (7.0 to 14.0 %), made in England during the 18th century for the Russian imperial court.

INDIA PALE LAGER- pale lager seasoned with hops commonly used in India Pale Ales.

INDUSTRIAL BREWERY- macro brewery, a very large brewery, automated, typically produces enormous quantities of beer belonging to a few styles, pasteurized and exported over long distances.

INFECTION- growth of microorganisms that spoils beer during brewing or before serving it to the customer.

INFUSION MASH- single infusion mash, mashing process carried out at a single temperature (the optimum one to convert starch into sugar).

INFUSE- adding to beer the essential flavor elements of an ingredient (examples: coffee, chocolate).

INTERNATIONAL DARK LAGER- International lager with a dark color instead of the usual golden yellow.

INTERNATIONAL PALE LAGER- International Lager, golden-yellow lager brewed in Europe, Asia, and other countries, frequently using rice (Asia) or corn (Europe) as adjuncts.

INVERT SUGAR- inverted sugar, syrup made of sucrose converted into glucose and fructose, used in brewing some Belgian and English ales, dark versions add color and flavor.

IRISH DRY STOUT- stout brewed with a portion of unmalted roasted barley that produces its characteristic flavor, it is light-bodied and ends dry, alcohol content typically varies between 4.0 and 5.0 %.

IRISH MOSS- *Chondrus crispus*, red alga that was for a long time the main source of carrageenan, an important clearing agent.

IRISH RED ALE- beer similar to the American Red Ale but ends drier, according to some sources it descends from reddish ales made in Ireland centuries ago, but it has been shown that the name originated in the United States during the 1980s.

ISINGLASS- one of the first clarifying agents, type of collagen isolated from the swim bladder of several fish, substituted today mostly by gelatins.

ISLAND SAISON- a saison that features citrus and other tropical flavors.

ISOAMYL ACETATE- banana ester, $C_7H_{14}O_2$, ester that imparts banana aroma, common in some German wheat beers.

ISOHUMULONE- active form of humulone, produced during the boiling of the wort, contributes most of the bitterness in beer, reacts with light to cause skunking.

ISOMERIZATION- structural change in a molecule that often alters its properties, for example the conversion of alpha acid to iso-alpha acid during the boiling of the wort.

ISOVALERIC ACID- $C_5H_{10}O_2$, compound produced when hops become oxidized, produces an aroma of cheese or sweaty socks.

J

JETTING- injection of a fine stream of sterile water just before attaching the crown cap, this causes foam to rise and expel the oxygen from the space between the liquid and the top of the bottle (headspace).

K

KEG- aluminum, stainless steel or plastic container used to store, transport, and dispense beer, available in several sizes.

KEGERATOR- refrigerator modified to contain one or two kegs and serve beer using taps, a similarly modified freezer is called a keezer.

KILNING- process of drying germinated barley grains by applying heat in a specially designed oven (*kiln*), third and final stage in the production of malt (the others are steeping and germination).

KÖLSCH- beer native to Cologne (Köln), Germany, golden in color, fermented with ale yeast but matured at lager temperatures, the yeast provides a delicate fruity aroma, alcohol content is around 5.0 %.

KRAUSEN- thick layer of foam that forms on the surface of the wort during fermentation, at its thickest it’s called high krausen.

KRAUSENING- addition of actively fermenting wort to finished beer in order to carbonate it.

KRIEK- lambic matured in the presence of cherries (kriek in Flemish) or blended with cherry juice, other popular variants are *framboise* (raspberry) and *pêche* (peach).

KRISTALLWEIZEN- filtered and crystalline German wheat beer.

KVEIK- Norwegian ale yeast capable of fermenting at unusually high temperatures without producing strong aromas and flavors.

L

LACE- Belgian lace, Brussels' lace, cling, foam that remains adhered to the glass as the beer recedes, for some drinkers, its abundance, shape and stability are important to enjoying the beer.

LACHANCEA- genus of yeasts that produce alcohol and lactic acid, used to make sour beer.

LACTIC ACID- $C_3H_6O_3$, compound responsible for sourness (tartness) in acid or sour beers, produced by *Lactobacillus* and *Pediococcus* bacteria.

LACTIC ACID FERMENTATION- process used by some bacteria (and by our muscles) to produce energy in the absence of oxygen, converts one molecule of glucose into two of lactic acid.

LACTOBACILLUS- genus of bacteria that produce lactic acid, used to make sour beer.

LACTOSE- milk sugar, $C_{12}H_{22}O_{11}$, disaccharide that yeast cannot ferment, used to add sweetness and body.

LAG PHASE- period during fermentation when the yeast adapts to the new environment and prepares its metabolic machinery.

LAGER- beer fermented by *Saccharomyces pastorianus*.

LAGERING- cold conditioning, method used for maturing (conditioning) lagers, consists of storing the beer at low temperature until it acquires the optimum flavor, *lagern* is German for storing and resting.

LAMBIC- sour beer native to the vicinity of Brussels, the wort is exposed to the environment overnight to cool down and acquire yeasts and bacteria, fermentation/maturation happens in wooden barrels and lasts six months to three years, alcohol content varies from 5.0 to 6.0%.

LATE HOPPING- addition of aroma hops late during boiling to increase aroma without increasing bitterness.

LAUTERING- process of separating the sweet wort from the spent grains, it can happen in the mash tun or in a separate tank called lauter tun (lauter means to clarify in German).

LIGHT BEER- 1. beer with fewer calories and alcohol than the regular version, 2. beer lighter in color, body and/or taste without necessarily having fewer calories or alcohol.

LIQUID BREAD- old moniker for beer due to its nutritive value and similar ingredients to beer (water, cereal and yeast), beer is no longer considered a foodstuff due to the detrimental effects alcohol.

LIQUOR- the water used to make beer, as opposed to that used for cleaning and other tasks.

LOGARITHMIC PHASE- exponential phase, period during fermentation when the yeast feeds, grows and reproduces at maximum speed.

LOVIBOND- degrees Lovibond, method used to describe the color of beer, replaced by the SRM but the name continues to be used because the units coincide.

LUPULIN- yellowish material produced by the hop glands, contains resins that impart bitterness and volatile oils that impart aroma.

LUPULONE- one of the beta acids present in hops, contributes little bitterness to beer.

M

MACRO BEER- beer produced industrially in huge quantities and often distributed worldwide, usually a pale lager (macro lager).

MAIBOCK- Helles Bock, golden bock made with pale malt, has close to 7.0% ABV, consumed in Germany mostly during spring (*Mai* means May).

MAILLARD REACTION- darkening that occurs when sugar and proteins are exposed to a very hot surface, forms melanoidins that impart flavor to dark malts.

MALT- 1. dried partially germinated grains (usually barley), main sugar source for making beer, 2. *malta* in Spanish, non-alcoholic, very sweet and almost black drink made with barley malt and hops, see malzbier.

MALT BEVERAGE- malt drink, a general term used for all beverages made with malt.

MALT EXTRACT- wort from which most or all the water has been removed to produce a concentrate with the consistency of syrup or flour.

MALT FORWARD- beer in which the malts dominate over the hops.

MALT LIQUOR- in the United States, generally a pale lager with 5.6 % ABV or more, obtained by using corn and sugar as adjuncts, frequently sold in 30-ounce (887 ml) bottles.

MALT TERROIR- aroma and flavor imparted to malts by the characteristics of a site, including topography, soil, water, and climate.

MALTASE- enzyme used by yeast to convert maltose into two glucose molecules which are then fermented.

MALTERNATIVES- *alcopops*, *alcoholic seltzers*, flavored alcoholic beverages made from barley malt but much more similar to wine, cider or other drinks than to beer (example: Sminrnoff Ice).

MALTERY- malting company, company specialized in the production of malts, some large breweries produce their own malts, the others acquire them from these companies.

MALTING- converting barley grains into malt so they can be used to make the beer, other grains can be malted being wheat the most common.

MALTOSE- malt sugar, main sugar present in barley malt, disaccharide composed of two glucose molecules.

MALTOSE-NEGATIVE YEAST- yeast strains that cannot ferment maltose (only the monosaccharides glucose and fructose), used in the production of non-alcoholic beer.

MALTOTRIOSE- trisaccharide fermented by yeast after fermenting monosaccharides and disaccharides, brewer’s yeast cannot ferment sugars composed of four or more monosaccharides.

MALTSTER- person who controls and supervises the malting process so that the product meets customer specifications.

MALZBIER- malt beer, old German dark beer with little alcohol, precursor to the popular non-alcoholic beverage called *malta* in Latin America.

MARMITE- paste made from leftover yeast from the fermentation process,, dark in color and with an intense aroma and flavor, spread on bread like jam.

MÄRZEN- Oktoberfest Märzen, Oktoberfest, amber lager native to Munich, Germany, served at the Oktoberfest festival until the 1990s, its color is due to the use of Munich malt, alcohol content varies from 5.0 to 6.0%.

MASH- mixture of ground grains and hot water used to start making beer.

MASHING- process of converting malt starch into sugar and part of the protein in amino acids, so that they are available to the yeast during fermentation.

MASHING-OUT- increase in temperature to close to 170 ^{o}F (77 ^{o}C) in order to stop enzymatic activity and finish the mashing process.

MASH TUN- cylindrical or round tank where mashing takes place.

MASS- *maß*, *masskrug*, one-litter glass stein, very popular at the Oktoberfest festival.

MATURATION- conditioning, process during which the yeast eliminates or modifies compounds that it produced during fermentation and the beer acquires its final flavor.

MELANOIDINS- dark pigments formed during the production of dark malts and the caramelization of sugars, they contribute strong flavors to fresh beer and sherry notes as beer ages.

MELIBIOSE- disaccharide formed by one molecule of glucose and one of galactose, can be fermented by *Saccharomyces pastorianus* but not by *S. cerevisae*.

MEXICAN LAGER- name used for pale lagers made in Mexico using corn as adjunct.

MICHELADA- popular Mexican drink made with pale lager, lime juice, hot sauce, salt and other seasonings.

MICROBREWERY- craft brewery which produces less than 15 thousand barrels annually.

MIDWEST IPA- an IPA that combines characteristics of west coast and east coast IPAs, some breweries use the name Southeast IPA.

MILKSHAKE IPA- India Pale Ale made with lactose and fruit.

MILK STOUT- *sweet stout*, *cream* stout, stout made with lactose (not with milk), see lactose.

MILLING- process of grinding malts and adjunct grains so that amylases have easy access to starch.

MIXED FERMENTATION- fermentation carried out by a combination of microorganisms grown in the laboratory.

MOCHA STOUT- stout brewed with the addition of coffee and chocolate.

MODIFICATION- degree to which starch has been converted to sugar and protein to amino acids; the longer the barley grains are allowed to germinate, the more modified is the malt they produce.

MONOSACCHARIDE- sugar made of a single molecule, yeast ferments two of them: glucose and fructose.

MOUTHFEEL- sensation produced by the body and effervescence of the beer.

N

NASOPHARYNX- back of the oral cavity, where taste and smell converge to produce the flavor of beer.

NATURAL FLAVOR- chemical compound responsible for a particular aroma and flavor, frequently made industrially using microorganisms.

NINKASI- Sumerian goddess of beer and brewing, a hymn dedicated to her describes beer production, including use of fruit, fermentation, and filtration.

NITROGENATION- substitution of most of the carbon dioxide for nitrogen, the minute bubbles of this gas produces a smooth and creamy foam.

NOBLE HOPS- group of hops cultivated for centuries that impart the aromas characteristic of European lagers, (examples: Hallertauer Mittelfrueh, Spalt, Tettnanger (Germany), Saaz (Czechia)).

NON-ALCOHOLIC BEER- near beer, beer with less than 0.5% ABV, it was the only beer produced legally during Prohibition, see 0.0 beer.

NONIC PINT- 20 oz (591 ml) glass very popular in British pubs, cylindrical with a bulging portion below the mouth that permits storing them closely together without the borders chipping (no nick).

NUCLEATED GLASS- glass with laser-etched marks on the bottom that serve as nuclei for bubble formation.

NUCLEATION SITES- places where carbon dioxide comes out of solution to form bubbles (examples: etchings on a nucleated glass, surface imperfections, adhered particles, grease spots).

O

OAK AGING- aging beer in metal tanks that contain oak barrel fragments or chips.

OATMEAL STOUT- stout made with oat flakes that add body and smoothness.

OFF-FLAVOR- undesirable flavor in a beer, although at low intensity it can be acceptable and even expected in another style (examples: green apple, banana, butter, cloves, sweet corn, cabbage, rotten egg).

OKTOBERFESTBIER- beer sold at the Oktoberfest festival, a pale lager with 5.8 to 6.3% ABV made by six Munich breweries: Augustiner, Hacker-Pschorr, Hofbräu, Löwenbräu, Paulaner, and Spaten.

ONE-OFF BEER- beer brewed once, without the intention of making it again.

OPEN FERMENTATION- fermentation carried out in tanks open to the environment, original way of fermenting beer.

ORGANIC BEER- beer made with ingredients that have not been exposed to inorganic fertilizers, herbicides or insecticides.

ORIGINAL GRAVITY (OG)- specific gravity of the wort before fermentation divided by the density of water (1.0), it is expressed to four decimal points (for example, 1.050).

ORTHONASAL OLFACTION- aroma perceived by directly smelling the beer.

OVER-CARBONATION- too much carbon dioxide in the beer, which can gush out of the container or produce a large amount of foam when poured into a glass.

OXIDATION- reactions that involve the capture of electrons by oxygen molecules, in most cases they ruin the beer over time, but see aging.

P

PALE LAGER- general term used for beers derived from the pilsner style, many people use lager, pale lager, golden lager and pilsner as synonyms.

PARTI-GYLE BREWING- method used to obtain two or more worts with different gravities from a single mashing, a different beer can be made from each wort, see first running, second running.

PASTEURIZATION- exposure of packaged beer to a high temperature in order to kill organisms that could change its aroma and flavor.

PASTRY STOUT- stout brewed with ingredients used commonly for making candies and desserts.

PEDIOCOCCUS- genus of bacteria that produce lactic acid, unlike *Lactobacillus* they require oxygen and produce diacetyl.

PELLICLE- thin layer of microorganisms that develops on the surface of beer aged in wooden barrels inhabited by bacteria and the yeast *Brettanomyces*.

PGA- *propylene-glycol-alginate*, chemical used to increase the stability of the foam layer, obtained from seaweeds.

pH- measure of the hydrogen ion (H^+) concentration in a solution, 7.0 is neutral, less is acid and more than is alkaline, the scale is logarithmic (thus a pH of 3.3 is ten times more acidic than a pH of 4.3).

PHANTASM- commercial product made from white wine grape skins, rich in thiol precursors that yeast convert into free thiols, thus increasing tropical fruit aroma.

PHENOLS- ring-like compounds produced by yeast that impart notes of spices, for example cloves.

PHYTASE- malt enzyme that lowers pH to the level needed by the enzymes that digest starch and proteins.

PILSNER- most famous beer style and first pale lager, for many drinkers pilsner, pale lager and lager are synonyms, alcohol content of regular versions is around 5.0%.

PILSNER GLASS- tall, narrow glass that widens gradually to form a cone, used to serve pale lagers.

PILSNER MALT- very polular base malt, used to make pale beers and combined with specialty malts to make dark beers.

PINT- 16 ounces (473 ml) of beer in the United States, 19.2 ounces (568 ml) in the United Kingdom.

PITCHING- addition of yeast to wort in order to start fermentation, when it comes from a previous fermentation the process is called repitching.

PLATO- degrees Plato, scale used to express the amount of extract present in the wort as a percent of the total weight, for example a wort with 10 degrees Plato contains 10 grams of extract in each 100 grams of wort (10 %).

POLYPHENOLS- molecules composed of one or more aromatic rings and one or more hydroxyl groups (-OH), they derive from malt and hops, at high concentrations may turn beer cloudy and cause astringency.

POLYSACCHARIDE- molecule composed of many simple sugars, for example a starch molecule is composed of a hundred to ten thousand glucose molecules.

PORTER- ale born in London early during the 18th century, first industrial beer exported around the world, very dark or black, typically sweetish, malty, often with notes of coffee and/or chocolate, alcohol content varies from just under 5% to very high in Imperial versions.

PRESSURIZED FERMENTATION- pressure fermentation, fermentation carried out in sealed tanks, the accumulation of carbon dioxide causes the pressure inside the vessel to exceed atmospheric pressure.

PRIMARY FERMENTATION- initial fermentation, produces almost all the alcohol present in beer, see secondary fermentation.

PRIMING- addition of sugar (sometimes also yeast) to carbonate the beer in the container, see bottle conditioning.

PRIMING SUGAR- sugar added to carbonate the beer in the container, usually glucose, fructose, or sucrose.

PROHIBITION- period between 1920 and 1933 when it was illegal in the United States to produce, sell and transport alcoholic beverages, lagers made before and after this period are known as pre-prohibition and post-prohibition lagers.

PROTEASES- malt enzymes that convert protein into amino acids that the yeast needs for its metabolism.

PROTEIN REST- pause during mashing when the temperature is held at about 125 ^{o}F (52 ^{o}F) so that proteases can convert proteins into amino acids.

PSEUDO LAGER- beer brewed with an ale yeast that produces very few esters and phenols, the result is an ale that seems to be a lager (pseudo means false).

PUB- abbreviation of public house, bar or tavern where beer and often food are sold.

Q

QUADRUPEL- Quad, dark and high alcohol Trappist beer, typically with 8.0 to 12.0% ABV.

QUAFFABLE- *crushable*, beer that can be consumed quickly and in large quantity, frequently a pale lager.

R

RADLER- German summer drink (in England shandy, in France *panaché*) made from approximately equal parts of beer and lemon soda, lemonade, or diluted fruit juice.

RAUCHBIER- literally smoked beer, brewed mostly in Bamberg, Germany, made with malt dried over a wood fire, before the 19th century most malt was dried like this

REAL ALE- name used by CAMRA for ales traditionally served in British pubs, they are unfiltered, fermented in the barrels where they're transported, and are served by gravity or using a hand pump (beer engine), see CAMRA.

RED IPA- India Pale Ale with an attractive mahogany color due to the use of caramel malt.

REDUCTONE- type of melanoidin that captures oxygen and therefore reduces the oxidation of beer.

REFRACTOMETER- compact instrument used to calculate gravity, works by measuring the refractive index of a wort sample.

REINHEITSGEBOT- decree issued in 1516 by the Duke of Bavaria, limiting the ingredients of beer to water, barley and hops (yeast was added later), still followed in Germany for making lagers.

RESIDUAL SUGAR- sugar that the yeast does not ferment, contributes sweetness and body to beer.

RESINS- sticky substances present in hops, provide bitterness to beer, the most common are humulone and lupulone.

RETRONASAL OLFACTION- aroma perceived when odors present in the throat back up to the nasal cavity.

RICE- *Oriza sativa*, grass native to Asia, originally cultivated in China, the seed is used as adjunct in the brewing of several pale lagers.

ROASTED BARLEY- unmalted barley roasted until the grains turn dark brown, provides a strong roasted note often reminiscent of coffee.

ROGGENBIER- rye ale, beer made with a portion of rye malt.

ROTBIER- beer native to Nuremberg, made initially with ale yeast but by the late 16th century was brewed as a lager, resurrected by the craft movement, decidedly red in color (rot means red), sweet, with fruity notes and ends rather dry.

RUNOFF- process of draining the sweet wort, separating it from the spent grains.

RYE- *Secale cereale,* grass native to the Middle East, widely cultivated for making bread and feeding animals, used in Europe for making beer until banned by the Reinheitsgebot, used today as an adjunct in craft beers.

RYE IPA- India Pale Ale made with a portion of rye malt.

S

SACCHARASE- invertase, enzyme used by yeast to convert sucrose into one molecule of glucose and one of fructose, thus being able to ferment it.

SACCHARIFICATION- conversion, process of transforming starch into sugar during mashing.

SACCHAROMETER- hydrometer calibrated to measure the concentration of sugar (density) in a solution.

SACCHAROMYCES- literally sugar fungus, genus of yeasts used to make beer and bread.

SACCHAROMYCES CEREVISIAE- yeast used to make ales, the species name means beer in Latin.

SACCHAROMYCES PASTORIANUS- yeast used to make lagers, product of a natural cross between *S. cerevisiae* and a wild yeast (*S. eubayanus*), the species name honors French microbiologist Louis Pasteur (1822-1895).

SAISON- old Belgian beer made in farms of Wallonia during the winter for consumption in the summer (saison means season), the modern version is typically golden, cloudy, light-bodied, with hints of spices and/or fruits, little influence of the hops, very effervescent and ends dry, alcohol content varies from 5.0 to 8.0%.

SANITIZATION- cleaning and disinfection of all the equipment used to brew and serve beer in order to avoid the growth of microorganisms that can damage the product.

SCHWARZBIER- Black Lager, dark or black lager native to Germany, its color is due to the use of highly roasted malt that complements the Munich base malt, may have chocolate and coffee notes that recall stouts, alcohol content is around 5.0%.

SCOTCH ALE- Wee Heavy, beer native to Edinburgh, Scotland, brewed with dark malt, sweet, with a toasted note and plenty of body, alcohol content exceeds 6.0%.

SEASONAL BEER- beer made during one period of the year (examples: Lambic, winter beer, Oktoberfestbier).

SECOND RUNNING- wort produced by a second sparging (rinsing) of the grains, contains less sugar and is used to make low-alcohol beers, see first running.

SECONDARY FERMENTATION- 1. fermentation that continues slowly during maturation (when beer acquires its final flavor), 2. fermentation that carbonates packaged beer, see bottle conditioning.

SECONDARY INGREDIENT- ingredient that does not provide sugar for fermentation.

SEDIMENT- layer of particles on the bottom of a beer container, composed of yeast in bottle conditioned beers, fruits and other ingredients can also produce sediment.

SESSION BEER- *sessionable, all-day,* relatively low-alcohol beer adequate for drinking two or more in a sitting, in the United States it has less than 5% ABV.

SHAKER PINT- 16-ounce (473 ml) glass very popular in the United States, cone-shaped and thus easy to stack, originally used to shake cocktails.

SHELF LIFE- estimated time during which beer will remain in good condition, depends mostly on storage conditions.

SIDE-PULL TAP- side-pour faucet, tap designed to produce a thick and long-lasting foam layer made of minute bubbles, used commonly for serving Czech pilsners.

SIX-ROW BARLEY- barley with the grains arranged in six rows, contains less carbohydrate, more protein and more digestive enzymes than two-row barley.

SIXTEL- sixth-barrel keg, keg with a capacity of one sixth of a barrel (5.2 gallons), popular among home brewers.

SKUNKING- effect of light on the iso-alpha acids present in beer, the resulting compound is very similar to that of the skunk, some breweries that use clear or green bottles avoid it by using a hop extract resistant to ultraviolet light.

SKUNKY BEER- beer affected by light, known also as skunky, lightstruck and sunstruck, see preceding entry.

SLOW POUR- the beer is poured aggresively on the center of the glass until the foam quickly reaches the top, after the foam recedes the process is carefully repeated once or twice, the goal is to obtain a layer of foam that projects well above the glass, see classic pour and hard pour.

SMALL BEER- *table beer,* beer with less than 2% ABV, formerly consumed by the whole family, often instead of water, made from the final rinse (*sparging*) of the grains.

SMASH- beer made with a single malt and single hop, useful to understand the contribution of these ingredients.

SNIFTER- glass similar to a wine glass but with a short stem, used frequently to taste beer because it concentrates the aroma.

SOLERA- method for aging wine, some liquors and some beers, consists of a series of barrels from which part of the content is periodically removed for consumption and the barrel is refilled with younger beer.

SORGHUM- *Sorghum bicolor,* grass native to Africa, first cultivated about 7,000 years ago, used in Africa to make sorghum beer, and in Europe and North America to make gluten-free beer.

SOUR BEER- tart beer, beer with a notable acidity due to the presence of lactic acid produced by bacteria.

SPARGING- sprinkling the grains with water after mashing in order to extract more sugar, see first running and second running.

SPECIALTY MALT- malt made to add color and flavor to beer, has no fermentable sugar.

SPECIFIC GRAVITY- amount of sugar present in the wort, the difference between the amount before and after fermentation is used to calculate the alcohol content of the beer.

SPENT GRAINS- remnant of the grains after producing the wort, frequently given away or sold as animal feed, used also to produce a protein- and fiber-rich flour.

SPICED BEER- beer seasoned with spices added before of after fermentation.

SPIDER CHART- diagram resembling a spider web, used to illustrate the balance of aromas and/or flavors present in a beer.

SPONTANEOUS FERMENTATION- wild fermentation, fermentation carried out by microorganisms that reach the wort spontaneously (not added by the brewer).

SPUNDING- process of carbonating the beer by sealing the fermentation tank, so that the carbon dioxide that cannot escape provides the carbonation.

SRM (Standard Reference Method)- method used in the New World to specify the color of beer, the scale goes from 1 (very pale) to 40+ (black).

STALE BEER- oxidized beer, beer degraded by oxidation reactions, identified by changes in color, aroma and flavor.

STANGE- slender 6.8 ounce (200 ml) glass used to serve kölsch in Cologne, Germany.

STARCH- molecule composed of long chains of glucose, used by plants to store the sugar produced by photosynthesis, main source of sugar to make beer, see amylopectin and amylose.

STATIONARY PHASE- period during fermentation in which food scarcity and the accumulation of metabolic wastes cause the yeast to stop growing and reproducing.

STEEPING- process of moistening barley grains so that they germinate, first stage in the production of malt (the others are germination and kilning).

STEIN- *tankard*, drinking container with a handle, old ones were made of ceramic and often had a lid to keep insects away, modern ones are made of glass and have no lid.

STEINBIER- beer made historically in wooden barrels where the wort was heated with very hot stones.

STEPPED MASH- mashing process that is held at two or more temperatures (rests) so that the yeast can optimally metabolize sugars and proteins.

STERILE FILTRATION- cold sterilization, draught filtered, filtration so fine that it can remove microorganisms, used by some breweries instead of pasteurization.

STOUT- name used initially for strong versions of porter (stout porters), black, with notes of roasted malt (often also coffee or chocolate), alcohol content ranges from less than 5% to very high in imperial versions.

STRAIN- variety of yeast or bacteria with one or more unique and useful characteristics.

STUCK FERMENTATION- stalled fermentation, fermentation that ends prematurely, leaving behind unfermented sugar.

STYLE- beers that share several characteristics, including color, flavor, brewing techniques, alcohol content, and geographic origin, boundaries are variable and some beers are very difficult to classify.

SUCROSE- table sugar, $C_{12}H_{22}O_{11}$, disaccharide composed of one molecule of glucose and one of fructose, present in low concentration in the wort, obtained commonly from sugarcane or sugar beets.

SUGGESTED MAXIMUM DAILY INTAKE OF ALCOHOL- the National Institute of Health (NIH) suggests a maximum daily consumption of 1.2 ounces (35.5 ml) of alcohol for men, this is found in two 12-ounce (355 ml) beers with 5% ABV, the limit for women is half due to their generally smaller size.

SULFITES- antioxidants added in low concentration to stabilize the flavor of packaged beer, used in higher concentration in wine (thus the need to mention them in the labels).

SUMMER IPA- Summer Ale, name used by some breweries for IPAs particularly light in color and alcohol, so that they're refreshing and appropriate for the hot summer days.

SWEET WORT- wort before the hops are aded.

T

TANNINS- compounds present in the hull of barley grains and in hops, when abundant they can make beer astringent.

TAP- metal faucet used to serve draft beer, should be cleaned regularly to prevent the growth of bacteria.

TAP LINE- beer line, tubing that connects a beer keg to the tap that serves it to the consumer, should be cleaned regularly to prevent the growth of bacteria.

TAPROOM- place where draft beer is sold, often is part of or belongs to a microbrewery.

TART IPA- Sour IPA, India Pale Ale with an acid (sour) note, sometimes slight, sometimes the sourness is as intense as the hops.

TASTE- sensation caused by the chemical compounds detected by the tongue, taste plus smell equals flavor.

TASTING- process of evaluating a beer to assess its properties and compare it with other beers, see horizontal tasting and vertical tasting.

TERPENES- aromatic variants of a five-carbon molecule called isoprene, many hop essential oils are terpenes.

TERROIR- characteristics imparted to malts and hops by the properties of the soil and environment where they are grown.

TETRA- hop extract immune to light, prevents skunking of beers packaged in clear, green and blue bottles.

TEXTURE- sensation caused by the effervescence, the bubbles can be stinging and feel rough, or they can be smooth and creamy.

THIOLIZED YEAST- yeast engineered to enhance the conversion of thiol precursors into free thiols, thus increasing aromas of guava and other tropical fruits.

THIOLS- organic compounds present in hops, similar to alcohols but contain -SH instead of the -OH group, they contribute fruity aromas.

TOP FERMENTATION- fermentation with ale yeast, thus called because towards the end of the process the yeast flocculates mostly on the surface of the liquid.

TORREFACTION- process of heating barley or wheat grains at high temperatures in a low oxygen environment, these grains contribute color, increase head retention and improve body.

TRANS-2-NONENAL- aldehyde that causes a wet cardboard flavor, common in old (stale) beer.

TRAPPIST BEER- beer made within the confines of Trappist monasteries, typically a Belgian ale with high alcohol content.

TRIPEL- golden Trappist ale with high alcohol content, typically 7.5 to 9.5 % ABV.

TRIPLE IPA- India Pale Ale brewed with much malt and is therefore high in alcohol (10% or more).

TRISACCHARIDE- sugar made of three monosaccharides, see maltotriose.

TROPICAL- adjective used to describe the aroma that certain hops impart to beer, includes mango, guava, passion fruit, and pineapple (examples: tropical IPA, tropical lager.

TROPICAL SAISON- saison with notes of tropical fruits contributed by hops and/or the yeast.

TRUB- sediment formed during boiling (hot break), cooling of the wort (cold break), and cold storage of beer (cold trub), composed mostly of polyphenols and proteins that can cause haziness.

TWO-ROW BARLEY- barley with grains arranged in two rows, contains more carbohydrate, less protein and fewer digestive enzymes than six-row barley.

TURBIDITY- haze, opacity, lack of clarity or transparency in beer, caused by proteins, yeast and small particles.

U

ULTRALIGHT BEER- beer with fewer calories than the light version, the reduction varies among brands.

UMAMI- fifth basic food taste (the others are sweet, salty, bitter, and sour), uncommon in beer but can be detected when a lot of yeast dies in the bottle.

V

VEGETABLE DYE- colorant obtained from plants, used to emphasize a tone or change the color of beer.

VERTICAL TASTING- evaluation of the same beer produced during consecutive time periods (usually years).

VIENNA LAGER- Austrian beer very similar to märzen but somewhat paler and redder due to the use of Vienna malt, alcohol content varies from 4.5 to 5.0%.

VITALITY- potential of yeast to ferment wort, tends to decrease when the same yeast is used over and over (*repitched*).

W

WATER- main ingredient of beer, it used to determine the type of beer that could be brewed in a locality, today compounds are added to bring pH and minerals to the optimum level, called soft water when it has few minerals and hard water when it has many.

WEISSBIER- weizenbeer, literally white beer and wheat beer, see German wheat beer.

WEIZENBOCK- variant of German wheat beer with more than 7% ABV.

WEST COAST IPA- original American India Pale Ale, yellow to amber, transparent, rich in malt, with aromas of pine and citrus, quite bitter.

WEST COAST PILSNER- pilsner made with hops typically used in West Coast India Pale Ales.

WET FOAM- thick foam layer produced with a side-pour tap that generates abundant and long-lasting minute bubbles, see dry foam.

WET HOPS- freshly harvested, undried hops.

WHEAT- *Triticum aestivum*, grass initially cultivated in the Middle East, very important food source, used to make bread and several beers.

WHEAT BEER- beer made with a substantial amount of wheat, in some cases more than barley.

WHEAT IPA- White IPA, American wheat beer made with significantly more hops and alcohol, or an India Pale Ale made with a considerable amount of wheat.

WHEAT WINE- American ale similar to barley wine but made with a portion of wheat malt that imparts smoothness.

WHIRLPOOLING- process of swirling the wort to isolate suspended solids and clarify it before fermentation.

WHITE STOUT- golden stout, pale stout, American ale with the flavor of a regular stout but golden instead of black, the notes of roasted malt, coffee and chocolate are produced with coffee, chocolate and vanilla, smoothness and body are obtained with wheat and/or oats.

WILD YEAST- yeast that arrives on its own account to the fermentation process, some have been domesticated and are grown in the laboratory.

WINTER BEER- winter warmer, Christmas beer, typically a dark, spiced, high alcohol beer made to “warm the body.”

WITBIER- literally white and beer, see Belgian wheat beer; some versions with more spices and alcohol have been called Double Witbier.

WORT- the liquid that yeast ferments to make beer.

Y

YEAST- single-celled fungus that ferments sugar, producing carbon dioxide, ethanol, esters, phenols and other compounds that impart flavor to beer.

YEAST GROWTH CURVE- diagram illustrating yeast population growth during fermentation, composed of four phases, see lag phase, log phase, deceleration phase, stationary phase.

0.0 BEER- beer with less than 0.05 % ABV, see non-alcoholic beer.

Z

ZYMOLOGY- zymurgy, branch of science that studies fermentation.

ZYTHOLOGY- branch of science that studies beer and brewing.

ZYTHOPHILE- beer aficionado, beer lover.